REMARKS

Claims 1-4 and 17 to 28 are pending.

Claim 2 has been amended. Basis for this amendment can be found, at least, on page 8, lines 3 to 20 of the specification as originally filed.

On page 3 of the Office Action, Claims 1-4, 19, 20, 22 – 24 and 26-28 are currently rejected under 35 USC § 103(a) as being unpatentable over WO 00/69074 (hereinafter referred to as the "Mann publication"). Applicants are traversing this rejection.

The application presently contains two independent claims, namely Claims 1 and 27. Below, Applicants explain that the Mann publication in combination with the practice of ordinary skill does not teach all of the elements of Claims 1 and 27.

According to page 7, lines 20 and 21, the Mann publication relates to a modulator 400 for a frequency synthesiser having a nested arrangement. The modulator is a second order modulator 402 that is extendible. The modulator is formed by coupling a first order modulator 401 to another modulator 402. The first order modulator 401 comprises an addition element 403, a delay element 405, a quantizer 406 and an addition element 408, the addition and delay elements 403, 405 serving as an accumulator (page 7, lines 21 – 27). As explained on page 7, line 28 – page 8, line 6, The modulator 402 receives an error signal and generates an output responsive to an input. Outputs on lines 407, 410 are combined in an additional element 411 to form an output signal Y. A feedback signal is derived from the output signal Y, the feedback signal being combined with a control word X.

Claim 1 recites a noise shaping arrangement for a phase locked loop. The arrangement comprises:

- a first order sigma-delta modulator arranged to provide a first-order quantized output and a feedback path output;
- a second order sigma-delta modulator coupled to receive the feedback path output from the first order sigma-delta modulator and arranged to provide a second order quantized output; and
- combination means arranged to combine the first and second order quantized outputs to provide a combined third order quantized output, wherein the

combined third order output provides noise shaping with a frequency notch spectrum.

Turning to page 3, lines 8 – 11, of the Office Action, it is stated:

"*Note the frequency domain analysis behaviour equation, see figure 4b. Inherently, based on the frequency domain equation and the second order modulation, there exists complex conjugate pair of zeroes.*" [Emphasis added]

The Applicant respectfully points out that the above-highlighted observation is incorrect. In this respect, the Mann publication does not teach a complex conjugate pair of zeroes. The frequency domain analysis behaviour equation of Figure 4a is a classical second order equation for a second order sigma-delta modulator having two zeros located at DC frequency. The structure of the modulator identified in the Office Action cannot provide a conjugate pairs of zeros, because a feedback gain is required in the arrangement of Figure 4a. Furthermore, block 412 would have to be something other than a traditional first order sigma-delta modulator if a complex conjugate pair of zeroes is to be achieved. Whilst the second order modulator of Figure 4a provides two zeroes at DC, the zeros are not complex conjugates.

Furthermore, on page 2, lines 17 – 19 of the Office Action, it is stated:

"*see p. 2, lines 15-25, suggests the implementation of such a modulator system used to reduce spurs(i.e. notch spectrum output). The combining means allows for scaling as the first and second order outputs will be added together.*"

Page 2, lines 13-18 of the Mann publication states:

"... *limit cycles in the modulation signal cause cyclic variation of the division value and generally produce spurious frequencies and additional phase noise in the synthesized output signal. Various cancellation schemes such as phase interpolation have been employed to reduce the fractional spurs and noise but ...* "

The Office Action states that this passage suggests the notch spectrum output. However, Applicants respectfully disagree. Applicants submit that the above passage from the Mann publication suggests nothing more than a system that cancels spurious from cyclic variations, such as dithering or phase interpolation. It does not teach providing noise shaping with a frequency notch spectrum. If this rejection is to be maintained, Applicant's respectfully request that the Examiner provide a basis in fact or

technical reasoning to support a determination that the cited portion of Mann teaches providing noise shaping with a frequency notch spectrum. Se MPEP 2112.

Consequently, it is submitted that the combination of the Mann publication with ordinary skill in the art does not teach the provision of noise shaping with a frequency notch spectrum, as recited in Claim 1.

In view of the reasoning provided above, Applicants submit that the Mann publication in view of ordinary skill does not render Claim 1 obvious.

Claims 2-4 and 17-26 depend from Claim 1. By virtue of this dependence, Claims 2-4 and 17-26 are also not obvious.

Claim 27 provides for a method for noise shaping in a phase-locked loop. The arguments submitted above in support of Claim 1 also apply to Claim 27 and so the Mann publication in view of ordinary skill in the art does not render Claim 27 obvious.

Claim 28 depends from Claim 27. By virtue of this dependence, Claim 28 is also not obvious.

The case is believed to be in condition for allowance and notice to such effect is respectfully requested. If there is any issue that may be resolved, the Examiner is respectfully requested to telephone the undersigned.

If Applicant has overlooked any additional fees, or if any overpayment has been made, the Commissioner is hereby authorized to credit or debit Deposit Account 503079, Freescale Semiconductor, Inc.

Respectfully submitted,

SEND CORRESPONDENCE TO:

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